PATENT APPLICATION

A DISTRIBUTED-SERVICE ARCHITECTURE AT THE POINT OF SALE OR SERVICE

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A DISTRIBUTED-SERVICE ARCHITECTURE AT THE POINT OF SALE OR SERVICE

This invention relates to protocol converters, distributed-service architectures and point-of-sale or point-of-service (POS) terminals. More specifically, this invention relates to accessing legacy and new POS services in a POS terminal.

BACKGROUND

Figure 1 illustrates a prior-art legacy point-of-sale (or service) terminal **100**. The POS terminal **100** includes a PIN pad **110**, a printer **120**, a scanner **130**, a signature-capture platform **140**, a check reader **150**, a register **160** and communications links **170**, **180**, **190**, **1A0** and **1B0**.

The links **170**, **180**, **190**, **1A0** and **1B0** communicatively and respectively couple the PIN pad **110**, the printer **120**, the scanner **130**, the signature-capture platform **140** and the check reader **150** to the register **160**. Each link is a direct (point-to-point) connection between a peripheral and the register **160**. Communications over each link follow a legacy protocol: RS485, RS232 or Universal Serial Bus (USB), for example.

Each of the peripherals **110** through **150** represents a service available to the POS terminal **100**. The POS register **160** contains the intelligence to operate and coordinate the peripherals **110** through **150** in order to perform the functions of a POS terminal. The POS register **160** maintains the state of the these peripherals and also the state of any ongoing transaction.

An example of prior-art POS-register intelligence is the operating system of the model 4690 POS terminal (available from

International Business Machines Corporation, Armonk, New York) and its application software. The IBM model 4690 operating system runs software such as General Sales Application (GSA), Supermarket Application, Drug Store Application and Chain Sales Application, all known in the art.

(Windows-based POS registers **160** and Windows POS applications are also available. Windows is a class of operating systems available from Microsoft Corp., Bellevue, Washington.)

IBM model 4690-based POS systems have known problems. The operating system is monolithic. All peripherals that the POS system **100** is to support must be determined at the time the operating system is constructed (compiled). Adding a new service involves configuring and compiling a new version of the operating system. Adding a new service also involves acquiring application software that can take advantage of the new service.

Adding a new service requires loading the new operating systems, the new application software or both. This loading often requires the system **100** to be taken offline, thus disrupting the business of the merchant. As such, adding new services can be time consuming — even prohibitively so.

Accordingly, a point of sale or service is desirable with greater availability on the addition of peripherals or services.

These and other goals of the invention will be readily apparent to one of ordinary skill in the art on reading the background above and the description below.

SUMMARY

Herein are described points of sale or service. According to various embodiment, a point of sale or service may include a register, a peripheral and a protocol converter. The protocol converter may communicatively couple the register and the peripheral. The register may communicate with the protocol converter using a first protocol while the

peripheral may communicate with the protocol converter using a second protocol. The register and the protocol converter may communicate using TCP/IP.

A second peripheral may communicate with the register using the first protocol and without the aid of the protocol converter. The point of sale or service may further include a processor communicatively coupled to the protocol converter, for accessing the first peripheral.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a prior-art legacy point-of-sale (or service) terminal.

Figure 2 illustrates a POS system incorporating an embodiment of the invention.

DESCRIPTION OF THE INVENTION

Figure 2 illustrates a point-of-sale (or service) system **200** incorporating an embodiment of the invention. The POS system **200** may include one or more peripherals — here, the PIN pad **110**, the printer **120**, the scanner **130**, the signature-capture platform **140**, the check reader **150** — as well as the communications links **170**, **180**, **190**, **1A0**, **1B0**, all of the art. The system **200** may also include a peripheral **250**, a POS register **260**, a data center **270**, a protocol converter **280** and communications links **290**, **2A0**.

The links **170**, **180**, **190**, **1A0**, **1B0** and **1C0** may communicatively and respectively connect the PIN pad **110**, the printer **120**, the scanner **130**, the signature-capture platform **140**, the check reader **150** and another peripheral **250** according to respective legacy communications protocols to the protocol converter **280**. The links **170**, **180**, **190**, **1A0**, **1B0** and **1C0** are direct (point-to-point) connections.

The link **290** may communicatively interconnect the POS register **260**, the protocol converter **280** and the controller **2B0**. The link **290**

may be an ethernet, running TCP/IP. Then the POS register **260**, the protocol converter **280** and the controller **2B0** may have TCP/IP as a native communications protocol.

Indeed, any peripheral **110** through **150**, **250** whose native communications protocol is the same as that of the link **290** may interconnect using the link **290** well. The signature-capture platform **140** is an example of such a peripheral.

The link **2A0** may communicatively couple the controller **2B0** and the data center **270**. The link **2A0** may be an internet — even the Internet.

The protocol converter **280** may convert communications using the legacy protocols over the links **170** - **1C0** to communications using the protocol of the communications link **290**. Example legacy protocols include RS485, RS232 and USB. The link **290** protocol may be TCP/IP, for example.

Each peripheral **110** through **150** connects to the protocol converter **280** as it connected to the POS register **160** of the prior art. The cables enabling the communications links **170**, **180**, **190**, **1A0**, **1B0** may be the same in the two POS systems **100**, **200**.

Any peripheral **110** through **150**, **250** whose native communications protocol is the same as that of the link **290** may interconnect using the link **290** or the protocol converter **280**. In such an instance, the converter **280** may work more like a repeater.

Because all of the peripherals **110** through **150**, **250** — and the services they provide — are accessible over the link **2A0**, any processor **2C0** with access to the link **2A0** may use the services of any of the peripherals. The transaction computer **2B0** may mediate a processor **2C0**'s access to the peripherals **110** through **150**, **250**.

The POS register **260**, the transaction controller **2B0**, the data center **270** or some other entity on the link **290** or the link **2A0** may maintain state regarding a service or transaction. The state information that one

such entity maintains may be duplicative, overlapping or disjoint from that which another such entity maintains.

In the POS system **200**, the intelligence to conduct a transaction may reside in the POS register **260**. The POS register **260**, however, may not be intelligent enough to communicate with one or more of the peripherals. Such intelligence may now reside in any entity with access to the peripheral — the transaction computer **2B0**, for example.

When a new service peripheral is added to the system **200**, the operating system or application software of the POS register **260** need not be rebuilt to interact with the new peripheral. For example, the intelligence of the transaction computer **2B0** may be sufficient or may be increased to interact with the new peripheral. Accordingly, the POS register **260** need not be shut down to accommodate the new peripheral, and the transactions that the register **260** processes do not need to stop while the register is upgraded. (Of course, the POS register **260** may be upgraded in addition or in the alternative.)

In one embodiment of the system **200**, a processor **2C0** or transaction computer **2B0** is programmed to interact with a new peripheral. The upgraded processor **2C0**, **2B0** mediates any interaction with the new peripheral. Where, for example, the new peripheral replaces an old one and the POS register **260** continues to communicate on the expectation that the old peripheral is present, the transaction computer may filter the communications on the link **190**, reading transmissions destined for the old peripheral, supplying transmissions for the new peripheral. Where the new peripheral is incapable of responding to the POS register **260** in the manner in which it expects, the transaction computer _**2B0** may convert transmissions from the new peripheral for the benefit of the POS register **260**.

The transaction computer **2B0** may abstract a service provided by a class of peripherals to be independent of the peripheral hardware. Say there are multiple versions of the scanner **130**, each requiring different data formats. The intelligence of the transaction computer **2B0** may include

a scanner interface with routines for initializing and resetting the scanner, retrieving data from the scanner, etc. Now, at the appropriate point in the transaction, the POS register **260** invokes the scanner-initialization routine on the transaction computer **2B0** and later invokes the retrieve-data routine. The transaction computer **2B0** has the entire responsibility of converting the data received as parameters to its scanner routines into data in the format required by whichever data format the scanner associated with the POS register **260** requires. (Of course, such an abstraction works as well with multiple peripherals, all communicating with the same data format.)

Using the Jini connection technology and its distributed-services paradigm, the services of a device may be further abstracted. Where, for example, the transaction computer **2B0** provides the Jini connection services, a peripheral may register with the Jini services. Later, when a processor **260, 2B0, 2C0** wants to access the peripheral's service, that processor **260, 2B0, 2C0** would query the Jini services. The Jini services return such information as necessary to allow the processor **260, 2B0, 2C0** to communicate with the peripheral. (The Jini connection technology is available from Sun Microsystems, Mountain View, California. Also, see www.sun.com/jini.)

The POS services that the peripherals make available may include capturing and processing signatures, reading and processing magnetic strips, displaying and processing line-item information, reading and processing personal identification numbers (PINs), processing payments, reading and processing smart-card information, recognizing and processing magnetic-ink characters (on checks, for example), printing, scanning and processing scanned information, serving advertisements and processing responses to them, serving and processing surveys, reading and processing scale information, displaying information, reading and processing biometric information, validating or verifying signatures, accessing storage (local or distributed), accessing CORBA services and

providing wireless services. The preceding is by way of example and not limitation.

The invention now being fully described, many changes and modifications that can be made thereto without departing from the spirit or scope of the appended claims will be apparent to one of ordinary skill in the art. A processor **260, 2B0, 2C0** may poll a peripheral to determine whether it has any data for transmission. Alternatively, a peripheral may raise an interrupt when it is ready to transmit data. In the latter case, the system **200** becomes an event-driven transaction system.